



A.D. 1796 N^o 2152.

S P E C I F I C A T I O N

OF

FRANCIS LLOYD.

FURNACE OR FIRE-PLACE.

L O N D O N :

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Furnace or Fire-place.

LLOYD'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, FRANCIS LLOYD, of the Parish of Woolstanton, in the County of Stafford, Iron Founder, send greeting.

WHEREAS His present Majesty King George the Third, by His Letters
5 Patent under the Great Seal of Great Britain, bearing date at Westminster, the Thirteenth day of December, in the thirty-seventh year of His reign, did give and grant unto me, the said Francis Lloyd, my exors, admors, and assigns, special licence, full power, sole privilege and authority, for and during the term of years therein expressed, to make, use, exercise,
10 and vend, within England, Wales, and the Town of Berwick upon Tweed, my Invention of "A FURNACE OR FIRE-PLACE, CALCULATED TO SAVE A GREAT EXPENCE IN FUEL, FOR ALL PURPOSES FOR WHICH THE SAME MAY BE APPLIED;" in which said Letters Patent there is contained a provisoe obliging me, the said Francis Lloyd, to describe and ascertain the nature of my said Invention, and
15 in what manner the same is to be performed, by an instrument in writing under my hand and seal, and cause the same to be inrolled in His Majesty's High Court of Chancery within one calendar month next and immediately after the date of the said Letters Patent, as in and by the same (relation being thereunto had) may more fully and at large appear.

20 NOW KNOW YE, that I, the said Francis Lloyd, in compliance with the said proviso, do declare that the nature of my said Invention consists as well, in some instances, in a new and different construction or formation of fire-places never before done, as in conveying the fire and heat into and about

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the vessells containing the liquids to be heated, boiled, or rarified within the
 vessells containing the same, as also without by means of pipes or flues, and
 also in using certain kinds of pipes or flues therein, which could never before
 be so employed with effect; and the same, as well as all other pipes and tubes,
 by being applied according to my new method, are rendered more durable, 5
 lasting, and usefull for the heating of liquids and raising steam than by any
 other method ever before practised or attempted; and further, my said In-
 vention consists of a stove or fire-place calculated to save fuel in and about
 the drying and kilning of malt and grain of all kinds, wool, and other materials,
 in a more regular and beneficial manner than by any other method ever before 10
 attempted or done; and the way in which the same is to be performed, is
 ascertained and described as well by the Figures and Delineations hereunto
 annexed as by the descriptions and explanations herein-after set forth (that is
 to say):—

As to fire-places and vessells for heating liquids and raising of steam for any 15
 use or purpose whatsoever, I set out the bottom or fire grate in any proper
 common mode, according to the size, form, or shape of the boiler or vessell con-
 taining the liquid to be heated, or from which steam is intended to be raised.
 N^o 1 shews the inside of the boiler. *a*, in that Figure describes, the inside pipe
 or flue; *b*, the point where the pipe is connected to the side of the boiler by pins 20
 and screws or other proper fastnesses, from which point there is a communi-
 cation between the fire-place beneath, and from whence the flame and heat
 ascends into and passes through the said pipe, which is in like manner con-
 nected with the side of the boiler at the point *c*, from whence there is a com-
 munication with the outside flue, as at *a* in N^o 2, which commences near or 25
 close to the wall of the chimney or stack next the same, and proceeds through
 the said outside flue, and enters the stack or chimney on the opposite side
 thereof; thus it is obvious that the said inside pipe or flue is subject to the
 action of a small part of the boiler, and in one direction only it is possible to
 vary the situation of the connection of the said inside pipe to the boiler; but 30
 as the connection with the side or end of the boiler next the chimney or stack,
 and at as little distance asunder as possible may be, is certainly best, as well
 for the preservation thereof as for the convenience of setting the boiler to work
 without the said inside pipe in cases of accident thereto (as herein-after de-
 scribed), I have therefore not noticed any such variations. The said inside 35
 pipe or flue is supported by chains or perpendicular mettle bars or mettle rods,
 in like manner as is used for supporting the bottoms of boilers, or by mettle
 bars from the sides of the boiler, or by both means, or any other proper mode.
 The inside pipe or flue may be of cast iron or other proper mettle or metallic

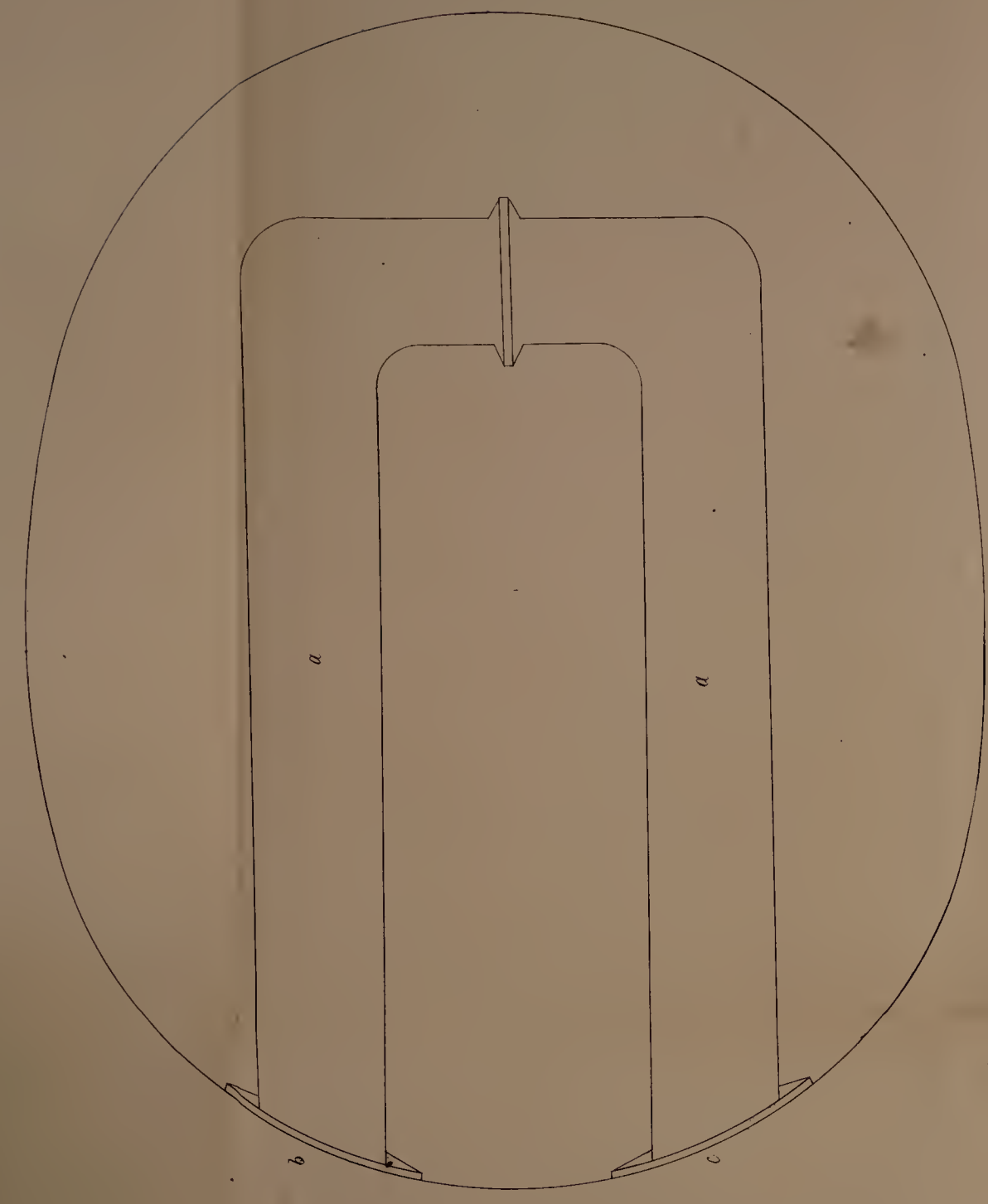
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substance capable of being cast, or of other such proper mettle or metallic substance, and are made of any proper shape or figure, and of the ordinary substance and thickness, as pipes or tubes of like dimensions are usually made and constructed. The said outside flue is made in the ordinary way. The
5 inside pipe or flue is placed as near the bottom of the boiler or vessell containing the liquid as possible to be clear of the same, and must be in capacity larger or smaller according to the size of the boiler, fire-place, and chimney flue. In all cases, the proper size and capacity of the inside pipes will be obvious, considering them simply as fire flues in the common way. In all
10 cases of large vessells for raising steam, I recommend the use of cast iron inside pipes or flues as being (in the end) the cheapest and (being applied on the foregoing principles) will be found sufficiently durable, lasting, and as well as all other kinds of pipes or flues, freed from the great injuries they are exposed to in any other way heretofore used. In cases of accident, misfortune, or
15 damage happening to the said inside pipe or flue rendering the same useless, by being provided with proper caps to stop the holes in the boiler side or end at the communication with the said pipe or flue, the boiler may be very soon set on to work again by also making up the communication between the fire and the said pipe or flue, and opening a like communication between the fire and
20 the commencement of the said outside flue at *a* in N^o 2, whereby any great delay or hindrance of business which might be occasioned in procuring another inside pipe will be prevented. For all other purposes, the said inside pipe may be varied according to the shape of the vessell containing the liquid to be heated, and to the convenience of the purpose for which the same is used,
25 observing always to carry the same to the greatest convenient extent of pipe or inside flue possible. In vessells of small capacity, and where there is any considerable depth of liquid, any proper pipe or flue may be fixed in or near the bottom of the vessell, as may be convenient, from the fire door, in an upright or other such like direction, and enter the chimney or outward flue to
30 such vessell as near the top thereof as may be, or above the same; but in cases where the said upright pipe is continued above the surface of the liquid, I would not recommend the use of cast iron pipes. In respect to my Invention for drying malt, grain, wool, and other articles, by the following directions, and by observing the following proportions, kilns of any size or dimensions may be
35 erected, or any kiln already erected may with little alteration or expence be converted thereto. To erect a kiln seventeen feet square I lay cast iron or other proper mettle beams or bearers, and bars or timber beams and joints proper and sufficient to support the kiln floor in the common way of supporting floors. In the place where the fire-place is set in common malt kilns, I erect

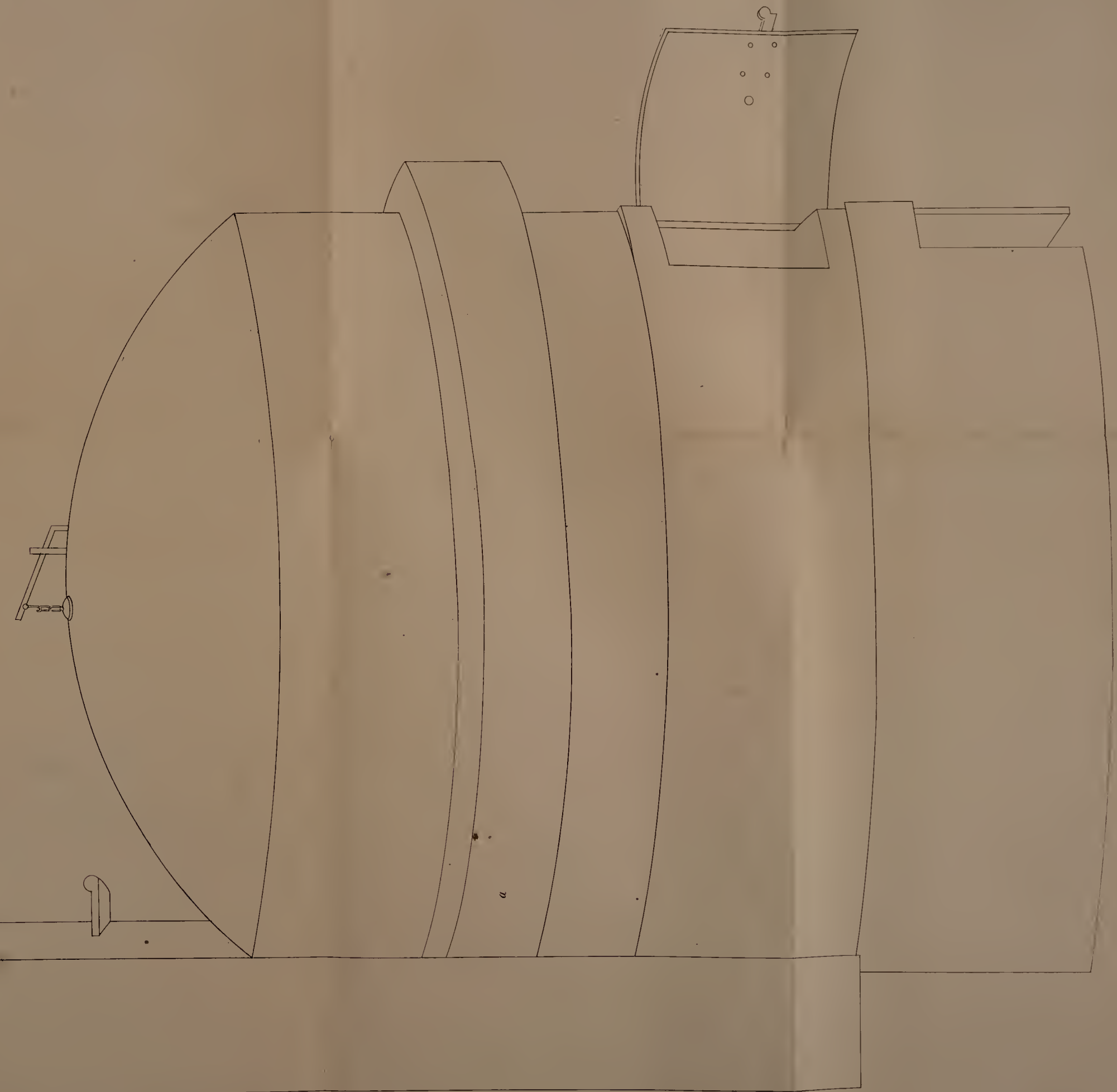
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a wall in a circular form, about nine inches in thickness, and about three feet in height, and about twenty-two inches clear within, leaving an open space of about twenty inches in width in front, and opposite to which open space a partition wall is raised across the said circular space with bricks to the whole height, and at about one third part of the diameter of the said circular space 5 from the back part thereof; a proper fire grate is then laid on the remaining part, and extending in length from the front to the said partition wall. The space under the fire grate is the ash cave upon the said wall, and over the said fire grate I throw a common cast iron stove pot, of an hollow semi-globular form, but rather deeper than half a globe, and about two feet and six inches 10 in diameter, having no opening in the top or sides but the fire door place. Within the said stove pot I make a partition of mettle to correspond with the said space between the space next the back part of the ash cave and the partition wall above mentioned in the said circular wall, or rather where good fire-bricks can be procured, I make the said division or partition by erecting 15 the same therewith on the said first-mentioned partition; this partition is to be continued up the said stove pot to within about four inches of the top or crown of the same, the use of which is to give more activity to the fire; and the better to heat the said crown of the stove pot, a fire door place about eight inches wide (to which is put a fire door) is left in the part intended for the 20 front part of the stove, which being done, this part is compleat. The situation is obvious, (that is to say,) the fire door will correspond with the opening in the ash cave (and the partitions with each other; about this circular wall and stove pot I erect a room about six feet square in the inside, they being in the centre. The walls of this room are raised six feet in height, from whence at 25 the four corners I raise four pillars, about eight inches in height, upon which is placed a stone, iron, or other proper material, similar to what in common malt kilns are called spark stones or plates; from the top of the said six foot walls and the bottom of the said pillars arches are sprung to abbut against the shell walls of the kiln at about fifteen inches below the under side of the kiln 30 floor; the said arch being close and connected round the whole kiln, admits the heat from the spaces between the spark plate and the said square wall to diffuse itself only in the space between the said arches and the under side of the kiln floor; the draft from the stove pot is effected by means of a flue about twelve inches square communicating under the stove pot with the division 35 before mentioned, and the space made by the partition in the first-mentioned circular wall separating the said space from the ash cave, and with a common chimney erected near any outside wall of the kiln. If it should be thought necessary, the said flue may be continued and conducted upon the said arch

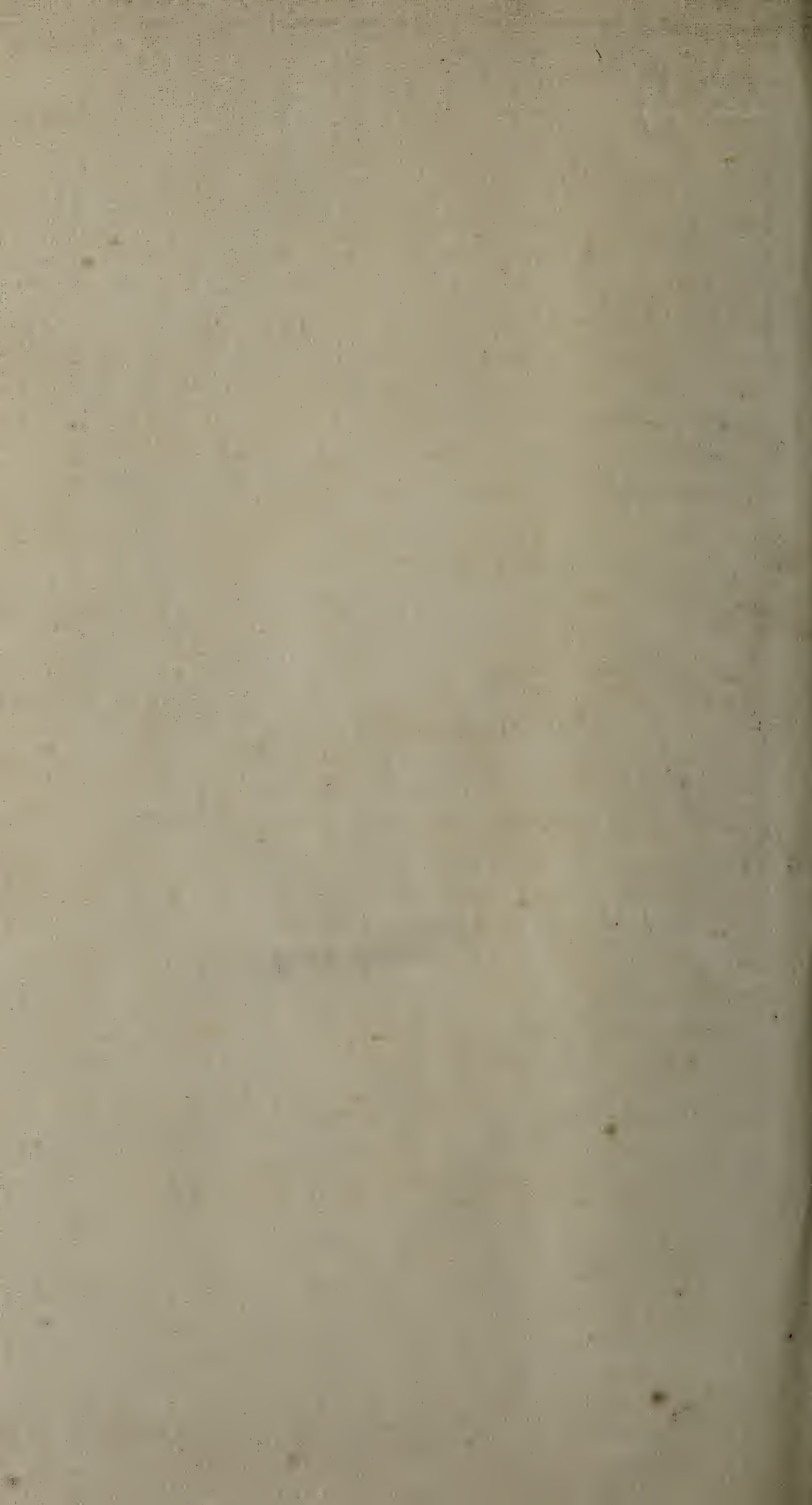
Nº 1.



Nº 2.



The cancelled drawings are partly retained



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round the whole kiln between the same and the floor, which I recommend to be constructed of bricks, about two inches in thickness, in which case the chimney must be erected nearly opposite the back part of the stove, and the flue to be placed upon the said arch close or near to the shell or out walls of the kiln, as being the coolest part thereof; the size and number of these fire-places will be in proportion to the size and shape of the kiln. Some part of the said six foot walls may be erected so as to be taken down occasionally to admit a person to clean the inside of the kiln. A common damper or register being placed in the chimney to regulate the draught, and doors being put to the door places to be made in the inner six foot square room, and to extreme part of the kiln, to prevent the admission of too much air, the kiln is compleat, and pit or any other coal or fuel may be used therein.

In witness whereof, I, the said Francis Lloyd, have hereunto set my hand and seal, the Ninth day of January, One thousand seven hundred and ninety-seven.

FRANCIS (L.S.) LLOYD.

Sealed and delivered in the presence of

WILL^M JOHNSON.

JOSEPH POOLE.

AND BE IT REMEMBERED, that on the Ninth day of January, in the year of our Lord 1797, the aforesaid Francis Lloyd came before our said Lord the King in His Chancery, and acknowledged the Specification aforesaid, and all and everything therein contained and specified, in form above written. And also the Specification aforesaid was stampd according to the tenor of the Statutes made for that purpose.

Inrolled the Twelfth day of January, in the year of our Lord One thousand seven hundred and ninety-seven.

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